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EXAMINER

CHOW, LIXI

ART UNIT PAPER NUMBER

2627

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/806,107

Applicant(s)

AHN ET AL.

Examiner

Lixi Chow

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 1706.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-20 are pending in this application.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/17/06 has been entered.

Claim Objections

3. Claim 15 is objected to because of the following informalities:

on line 3 of claim 15, the phrase 'the power of' should be deleted; and on line 4 of claim 15, the phrase "the start point the recording pattern" should be --the start point of the recording pattern--. Appropriate correction is required.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1 and 4-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2 and 4-20 of copending Application No. 10/806,318. Although the conflicting claims are not identical, they are not patentably distinct from each other because both applications claim recording of recording pattern having multi-pulse and recording of erase pattern having multi-pulse. In claims 1 of the instant Application recites "a recording waveform generating unit which generates a recording waveform having an erase pattern containing a multi-pulse and a recording pattern containing another multi-pulse"; this limitation corresponds to "a recording waveform generating unit generating a recording waveform which includes a first multi-pulse having a plurality of first pulse to form the recording pattern in response to the first level of the input data and second multi-pulse having a plurality of second pulse to form the erase pattern in response to the second level of input data", as recited in claim 1 of Application No. 10/805,318. The apparatus as claimed in claim 1 of Application No. 10/806,318 would obviously include the pickup unit, because the apparatus is performing recording and/or erasing of patterns on the optical recording medium.

In regards to claim 4 of instant Application, the limitation "a recoding waveform generating unit which generates a recording waveform comprising the recording pattern, an erase pattern having a multi-pulse, and a cooling pulse concatenating the recording and erase patterns" is essentially the same as the limitation "recording waveform generating unit generating a recording waveform which comprises the recording pattern corresponding to the first level of the

input data, the erase pattern having a multi-pulse corresponding to the second level of the input data, and a cooling pulse concatenating the recording and erase patterns” that is recited in claim 5 of Application No. 10/806,318. The apparatus as claimed in claim 5 of Application No. 10/806318 would obviously include the pickup unit, because the apparatus is performing recording and/or erasing of patterns on the optical recording medium. The pickup unit which records mark and/or space as recited in claim 4 of instant Application would correspond to the pickup unit recited in claim 4 of Application No. 10/806,318. Furthermore, the cooling pulse as recited in claim 4 corresponds to the cooling pulse claimed in claim 2 of Application No. 10/806318.

In regards to claims 5-20 of instant Application, the limitations presented in claims 5-20 are similar to the limitations presented in claims 2 and 6-20 of Application No. 10/806,318. Hence, those claims are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the copending Application No. 10/806,318.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

6. Claims 2 and 3 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 4, and 5 of copending Application No. 10/806318 in view of Ichihara.

In regards to claim 2 of instant Application, claims 1 or 4 of Application No. 10/806318 do not disclose a channel modulation unit which channel modulates data; however, Ichihara discloses an optical recording apparatus comprising a channel modulation unit which generates data provided from an outside source, and output an NRZI data signal to the recording waveform

generating unit (see Fig. 5, element 26; and Figs. 1A and 1B show the NRZI waveform and recording waveform, respectively).

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to have channel modulation unit for modulating the data provided from the outside source in the apparatus disclosed in the Application No. 10/806318. On of ordinary skill in the art would have been motivated to modulate the data input from the outside source, because conversion of recording data into a predetermined row of code bit is processed by modulation unit (see Col. 10, lines 39-45). Hence, modulation unit would be needed in order to correctly record information on the optical recording medium.

In regards to claim 3 of instant Application, claims 1 or 4 of Application No. 10/806318 do not, but Ichihara discloses an apparatus for recording information on the optical recording medium, wherein the pickup unit comprises:

- a motor which rotates the optical recording medium (see Fig. 5, element 12);

- an optical head having a laser device which generates a laser beam to the optical recording medium or receives the laser beam reflected from the optical recording medium (Fig. 5, element 13);

- a servo circuit which servo-controls the motor and the optical head (Fig. 5, element 24 and/or 22; and Col. 10, lines 25-38) ; and

- a laser driving circuit which drives the laser device installed in the optical head (Fig. 5, element 25).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to include the above components shown in Fig. 5 of Ichihara into the optical

pickup unit disclosed by Application No. 10/806318. One of ordinary skill in the art would have been motivated to do this, because every component contained in the optical pickup, listed above, are crucial for carrying out recording and/or reproducing of information to and/or from an optical recording medium (see Col. 10, lines 25-64).

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 recites in part, “a power level of a pulse between an end point of the erase pattern and a start point of leading pulse of the recording pattern...” However, this limitation is ambiguous as to whether such pulse can exist. Essentially, the end point of the erase pattern is the beginning point of the recording pattern. Also, it is not clear as to whether the “pulse between an end point of the erase pattern and a start point of the recording pattern” belongs to the portion of the erase pattern or to the portion of the recording pattern. In contrast, Applicant does in fact disclose a time period (Tsfp) from a point where the NRZI data is transitioned from a low level to high level at the point when the first pulse constituting the recording pattern starts. However, as indicated in the Applicant’s disclosure, Tsfp is a period, not a pulse. Claims 4, 7, 19 and 20 include similar problem as claim 1. Accordingly, the subject matter in claims 1, 4, 7, 19 and 20 is indefinite.

Furthermore, claim 14 recites in part, “the power of the first one of the multi-pulses of the recording pattern is equal to the first pulse power”. This is not consistent with the limitations in claims 1 and 10. For example, claim 10 specifies that the first one of the multi-pulses of the recording pattern is greater than both the first pulse power and a second pulses power of the erase pattern.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1, 3-6, 9, 11-13 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Dekker (US Pub. No. 2002/0003762).

Regarding claim 1:

Dekker discloses an apparatus (see Fig. 3) for recording data on an optical recording medium, comprising:

a recording waveform generating unit which generates a recording waveform having an erase pattern containing a multi-pulse and a recording pattern containing another multi-pulse (see Fig. 1A; erase pulses 14 corresponds to the erase pattern, and write pulses 13 corresponds to the recording pattern), a power level of a leading pulse of the erase pattern being a low level of the multi-pulse and a power level of a pulse/period between an end point of the erase pattern and a start point of a leading pulse of the recording pattern being a high level of the multi-pulse (see

Fig. 1A; the period between the end point of the erase pulses 14 and start point of another recording pattern is at high power level P1; as shown in the figure, power level P1 is higher than power level at the leading portion of the erase pulses 14); and

a pickup unit (see Fig. 3, elements 31-35) which generates light to the optical recording medium according to the generated recording waveform so that a mark or a space is formed on the optical recording medium (see paragraph [0028]).

Regarding claim 3:

Dekker discloses the apparatus, wherein the pickup unit comprises:

a motor (Fig. 3, element 34) which rotates the optical recording medium;

an optical head (Fig. 3, elements 31-33) having a laser device which generates a laser beam to the optical recording medium or receives the laser beam reflected from the optical recording medium;

a servo circuit (Fig. 3, element 35) which servo-controls the motor and the optical head;
and

a laser driving circuit (Fig. 3, element 31) which drives the laser device installed in the optical head.

Regarding claim 4:

Claim 4 recites similar limitations as claim 1; hence, claim 4 is rejected under the same reasons set forth in claim 1. In addition to claim 1, Dekker also discloses a cooling pulsesconcatenating the recording and erase patterns (see Fig. 1A; cooling pulse is the pulse that connects the write pulses 13 and the erase pulses 14).

Regarding claim 5:

Dekker discloses the apparatus, wherein the recording waveform generating unit generates a further multi-pulse of another recording pattern, and a cooling pulse as a portion of the multi-pulse of the erase pattern and another portion of the further multi-pulse of the another recording pattern (see Fig. 1A; it is inherent that recording waveform 21 includes another multi-pulse of the another recording pattern; the cooling pulse is the pulse connecting each multi-pulse erase pulses and multi-pulse write pulses).

Regarding claim 6:

Dekker discloses the apparatus, wherein the generating unit adjusts a pulse of the recoding pattern according to a pulse of the multi-pulse of the erase pattern (see Fig. 1A, the leading pulse of the another write pulses 13 is adjusted in the same manner as the trailing pulse of the erase pulses 14).

Regarding claims 9, 11 and 12:

Dekker discloses the apparatus, wherein the recording waveform comprises another recording pattern formed of a further multi-pulse, and the recording waveform generating unit adjust a first one of the multi-pulses of the another recording pattern to have a power that is greater than the power of the pulse/period between the end point of the erase pattern and the start point of the recording pattern (see Fig. 1A; it is inherent that the recording waveform 21 includes another multi-pulse recording pattern; power level P_w is greater than P_1).

Regarding claim 13:

Dekker discloses the apparatus, wherein the multi-pulse of the erase pattern has a first pulse power and a second pulse power greater than the first pulse power, and the power of the first one of the multi-pulses of the erase pattern is equal to the first pulse power (see Fig. 1A;

first pulse power corresponds to the power level below P1, and the second pulse power corresponds to power level P1).

Regarding claim 15:

Dekker discloses the apparatus, wherein the multi-pulse of the another recording pattern further comprises a recording pulse having a recording power greater than the power of the pulse between the end point of the erase pattern and the start point of the recording pattern (see Fig. 1A, power P_w is greater than power P_1).

11. Claim 19 is rejected under 35 U.S.C. 102(e) as being anticipated by Ichihara (US 6,396,792).

Regarding claim 19:

Ichihara discloses an apparatus (see Fig. 5) for recording data on an optical recording medium, comprising:

a recording waveform generating unit (see Fig. 5, element 25) which generates a recording waveform having an erase pattern containing a multi-pulse and a recording pattern containing another multi-pulse, (see Figs. 1A and 1B) a power level of a leading pulse of the erase pattern being a high level of the multi-pulse (see Fig. 1B, the leading pulse of the erase pattern is at power level P_{c1}) and a power level of a pulse between an end point of the erase pattern and a start point of a leading pulse of the recording pattern being a high level of the multi-pulse; and (see Fig. 1B and col. 6, line 62 to col. 7, line 1; Ichihara teaches that the power level of the pulse/period between the erase pattern and the recording pattern can be changed from P_{c1} to P_a , which suggest that the pulse/period between the end point of the erase pattern and the start point of the recording pattern is at power level P_{c1});

a pickup unit (see Fig. 5, element 13) which generates light to the optical recording medium according to the generated recording waveform so that a mark or a space is formed on the optical recording medium (see Fig. 1D).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dekker in view of Ichihara (US 6,396,792). For a description of Dekker, see the rejection of paragraph 10, above.

Regarding claim 2:

Dekker fails to disclose the apparatus further comprising; a channel modulation unit which channel modulates data provided from an outside source, and outputs an NRZI data signal to the recording waveform generating unit. However, Ichihara discloses an optical recording apparatus comprising a channel modulation unit which generates data provided from an outside source, and output an NRZI data signal to the recording waveform generating unit (see Fig. 5, element 26; and Figs. 1A and 1B show the NRZI waveform and recording waveform, respectively).

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to have channel modulation unit for modulating the data provided from the outside source in the apparatus taught by Dekker. On of ordinary skill in the art would have been motivated to modulate the data input from the outside source, because conversion of

recording data into a predetermined row of code bit is processed by modulation unit (see Col. 10, lines 39-45). Hence, modulation unit would be needed in order to correctly record information onto the optical recording medium.

14. Claims 7, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dekker in view of Clark et al. (US 5,802,031; hereafter Clark). For a description of Dekker, see the rejection of paragraph 10, above.

Regarding claims 7 and 8:

Claim 7 recites similar limitations as claim 1, therefore, those limitations that are similarity met by Dekker reference. However, Dekker fails to disclose the data recorded using the waveform modulated according to a Run Length Limited (RLL) (1,7); and/or wherein the waveform generating unit generates the recording waveform using the input data modulated according to a Run Length Limited (RLL)(1,7) method. On the other hand, Clark discloses the recording of data using the waveform modulated according to a Run Length Limited (RLL) (1,7) (see Clark, col. 6, lines 51-59).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have adopted the method of recording data according to a Run Length Limited (RLL) (1,7) in the medium of Dekker as taught by Clark. One of ordinary skill in the art would have been motivated to do this, because recording of marks and spaces of length 2T to 8T for standard M-O recording system is possible (see Clark, col. 6, lines 51-59). Hence, recording of marks or spaces amongst different types of recording format can be achieved.

Regarding claim 10:

Claim 10 recites similar limitation as claim 9; hence, the limitation in claim 10 is being similarity met by Dekker reference.

15. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dekker in view of Nakamura et al. (US 6,280,810; hereafter Nakamura). For a description of Dekker, see the rejection of paragraph 10, above.

Regarding claims 16-18:

Dekker discloses the apparatus, wherein the recording waveform further comprises a cooling pulse concatenating and included in the erase pattern and the additional recording pattern (see Fig. 1A). However, Dekker fails to disclose the cooling pulse having a cooling power less than a power of the last pulse of the another multi-pulse of the recording pattern and a power of a first pulse of the multi-pulse of the erase pattern. On the other hand, Nakamura discloses a recording pattern comprises a cooling pulse concatenating the recording and erase patterns and having a cooling power less than the power of the first pulse of the recording pattern and the low power level or the power of a first pulse of the multi-pulse of the erase pattern (see Fig. 8A or 8B; pulse T3 or T4 is the cooling pulse having power less than the power of record and erase pulse).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the recording waveform of Dekker, such that the cooling pulse has power level below recording and erase pulse as taught by Nakamura. One of ordinary skill in the art would have been motivated to do this, because a cooling pulse provides rapid cooling of the recording layer, so as to form a clear boundary of the write mark at the front/back edge in the recording layer (see col. 15, lines 27-33).

16. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohno et al. (US 5,150,351; hereafter Ohno) in view of Furumiya et al. (US 5,490,126; hereafter Furumiya).

Regarding claim 20:

Ohno discloses an apparatus for recording data on an optical recording medium, comprising:

a recording waveform generating unit which generates a recording waveform having an erase pattern containing a multi-pulse and a recording pattern containing another multi-pulse, a power level for a leading pulse of the erase pattern being a low level of the multi-pulse (see Fig. 4(b); leading pulse of the erase pattern has power level P_r); and

a pickup unit which generates light to the optical recording medium according to the generated recording waveform so that a mark or a space is formed on the optical recording medium (see Fig. 6, element 5).

Ohno fails to disclose a power level of a pulse/period between an end of the erase pattern and a start point of a leading pulse of the recording pattern to be the low power level of the multi-pulse. However, Furumiya discloses an apparatus for recording data on an optical recording medium, wherein the power level between an end of the erase pattern and a start point of a leading pulse of the recording pattern to be a lower power of the multi-pulse (see Fig. 1(b)).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the recording waveform of Ohno, so that the power level between an end of the erase pattern and a start point of the recording pattern is a low power level of the multi-pulse as taught by Furumiya. One of ordinary skill in the art would have been motivated to do this, because the occurrence of the edge shift caused by thermal interference across a shorter

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space in recording, the nonlinearity of a short mark, and the equalization characteristics during recording can be compensated for (see col. 2, line 65 to col. 3, line 2).

Response to Arguments

17. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lixi Chow whose telephone number is 571-272-7571. The examiner can normally be reached on Mon-Fri, 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, A. L. Wellington can be reached on 571-272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LC 9/12/06


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SUPERVISORY PATENT EXAMINER